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54 A method and device for the bubble-free filling of bags made of a foil material

When filling bags made of a foil material, like plastic bags for so-called bag-in-box packaging whose foil layers are welded together, difficulties are encountered to the extent that air pockets forming at the edge along the bag weld make it difficult to achieve the required bubble-free filling of such bags. Furthermore, air particles that are present in the bag or were drawn-in with the poured material can be mixed with the material to be poured. In accordance with the invention, a bubble-free filling of such foil bags is achieved by filling and inflating each bag first with a gaseous medium under pressure, such as air, inert gas or similar that is inert with respect to the material to be poured. During the actual filling process, the material to be poured is then supplied with a feed tube or similar device right to the bag wall located below the feed nozzle or plug of the bag and is poured into the bag while simultaneously displacing the gaseous medium from the lowest point in the bag to the feed nozzle or plug located at the highest point of the bag, and the feed nozzle or plug is closed in an air-tight manner after suctioning-off the remaining gas after the pouring process.

## Description

The invention concerns a method for the bubble-free filling of foil bags according to the preamble of claim 1 and also concerns a device to realize the process.

When using feed nozzles or plugs to fill bags made of a foil material, like plastic bags for so-called bag-in-box packaging, whose foil layers are welded together, difficulties are encountered to the extent that air pockets forming at the edge along the bag weld make it difficult to achieve the required bubble-free filling of such bags. Furthermore, air particles that are present in the bag or were drawn-in with the material to be poured can be mixed with the material to be poured. Such air pockets may cause premature spoiling of particularly sensitive materials to be poured. Accordingly, it is absolutely necessary to achieve a bubble-free filling of the bags to prevent contamination through air pockets of sensitive materials to be poured.

The task of the invention consists in the development of a method and of a device to realize the method, with which it will be a simple task to fill foil bags whose foil layers are welded together in a bubble-free manner.

In accordance with the invention, this task is solved according to the characterizing section of claim 1, while claims 3 through 9 characterize a particularly advantageous device to realize the method.

The formation of cracks and corners in the area of the bag weld is prevented by inflating the bag with a gaseous medium such as air, inert gas or similar that is inert with respect to the material to be poured, prior to the filling process. The bag "tent" remains stable and the flow of the material to be poured impacts the bag wall opposite the feed nozzle or plug by lowering the filler tube in relation to the feed nozzle and is thus able to freely expand without whirling with the gaseous particles and without any disturbance from the opposite bag wall. The air bubble transport is optimal due to the most favorable flow conditions. The material filling flow is always under control. By correspondingly tilting the bag support, it is possible to achieve an optimal level determination, to achieve an at least partial below-level filling and there will be no air bubbles or air pockets at the inclined welds of the foil material.

A preferred design example for the invention is shown schematically in the drawings. The drawings show the following:

**Figure 1** shows a method for the bubble-free filling of foil bags at the beginning of the filling process;

**Figure 2** shows the filling of the bag at an advanced stage; and

**Figure 3** shows a filler device suitable for realizing the method.

When filling a foil bag with a liquid or pasty material for a so-called bag-in-box packaging that is fitted with a feed nozzle or plug and whose foil layers are welded together, it is essential to ensure a bubble-free filling of the bag.

As shown in Figures 1 and 2, each bag 1 hanging from a bag strand is initially filled and inflated under pressure with gaseous medium 3, such as air, inert gas or similar, in which case said medium is inert with respect to filling material 2. For the actual filling process, filling material 2 is then supplied through a tube or similar device close to wall 5 of bag 1 below feed nozzle or plug 4 and then poured into bag 1 while simultaneously displacing gaseous medium 3 from the lowest point of bag 1 to feed nozzle or plug 4 located at the highest point of the bag; after the filling process and

after suctioning-off the remaining gas, filler nozzle or plug 4 is then closed in an air-tight manner. Feed nozzle or plug 4 is held in place by guide 6 during the filling process.

During the filling process, bag 1 consisting of a foil material with edge welds rests on support 7 that is inclined in one or more directions, while the device used to realize the process consists of a filler assembly 8 that has filler tube 9 sealed at nozzle 4, can be placed on feed nozzle or plug 4 of bag 1 and can be lowered like a telescope into feed nozzle or plug 4, in which case a suction device 10 is fitted at ring-shaped volume 11 between filler nozzle 4 and filler tube 9.

As shown in Figure 3 in more detail, filler tube 9 is fitted with valve cone 12 that can be moved in the direction of the tube axis between a closed and open position and is fitted with opening 13 for gaseous medium 3 arranged in the valve axis or parallel with it. Furthermore, filler tube 9 can be moved vertically in seal collar 14 that can be placed on feed nozzle or plug 4.

Seal collar 14 holds suction tube 15 with valve 16 for gaseous medium 3 that can be closed when the need arises. Valve 16 can be controlled as a function of pressure in such a manner that it lets the gaseous medium escape in a uniform manner, i.e., when filling bag 1, and according to the filling process through a pipe system for reuse of the medium and to suction gas quantities that remain above material to be filled 2 and to tightly close nozzle 4.

To create optimal conditions for the filling of bag 1, support 7 for bag 1 is preferably shaped like a trough and it may be made of an elastic material such as a rubber strip, inflatable rubber or plastic material cushion or similar. Furthermore, its angle in relation to filler tube 9 or a vertical line can be adjusted such that the bag strand gradually slides on support 7 after the filling process and the bag elements are transported one-after-another and under the effects of gravity to filler device 8.

#### Patent claims

1. A method for the bubble-free filling with a liquid or pasty material of foil bags that are fitted with a feed nozzle or plug and have their foil layers welded together, particularly for a bag-in-box packaging, **characterized by the fact that** each bag is initially filled and inflated under pressure with a gaseous medium such as air, inert gas or similar, in which case said medium is inert with respect to the material to be poured, and that the material to be poured is then, for the actual filling process, supplied through a filler tube or similar at a point close to the bag wall below the feed nozzle or plug and is then filled into the bag while simultaneously displacing the gaseous medium from the lowest point of the bag to the feed nozzle or plug located at the highest point of the bag, and that the filler nozzle or plug is then, after the filling process and after suctioning-off the remaining gas, closed in an air-tight manner.
2. A method in accordance with claim 1, characterized by the fact that the bag rests at an angle on a support inclined in one or more directions.
3. A device to realize the method in accordance with claim 1 or 2, characterized by the fact that a filler assembly (8) has a filler tube (9) sealed at the nozzle (4), can be placed on the feed nozzle or plug (4) of the bag (1) and can be lowered like a telescope into the feed nozzle or plug (4), in which case a suction device (10) is fitted at the ring-shaped volume (11) between the filler nozzle (4) and the filler tube (9).
4. A device in accordance with claim 3, characterized by the fact that the filler tube (9) has a valve cone (12) that can be moved in the direction of the tube axis between a closed and open position and is fitted with the opening (13) for the medium arranged at the valve axis or parallel to it.

5. A device in accordance with claims 3 and 4, characterized by the fact that the filler tube (9) can be moved longitudinally in the sealing collar (14) that can be placed on the feed nozzle or plug (4) of the bag (1).
6. A device in accordance with claims 3 through 5, characterized by the fact that the sealing collar (14) holds a suction tube (15) with a valve (16) for the gaseous medium (3) that can be shut off when required.
7. A device in accordance with one of claims 3 through 6, characterized by the fact that the support (7) for the bag (1) is formed like a trough.
8. A device in accordance with one of claims 3 through 7, characterized by the fact that the support (7) for the bag (1) consists of an elastic material such as a rubber strip, an inflatable rubber or plastic material cushion or similar.
9. A device in accordance with claim 7 or 8, characterized by the fact that the angle of support (7) for the bag (1) can be adjusted in relation to the filler tube (9) or to a vertical line.

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This document includes 2 pages with drawings

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DRAWINGS PAGE 1

Number:	<b>DE 39 22 779 A1</b>
Int. Class. <sup>5</sup> :	<b>B 65 B 3/04</b>
Disclosure date:	January 17, 1991

FIG. 1

FIG. 2

DRAWINGS PAGE 2

Number:	<b>DE 39 22 779 A1</b>
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FIG. 3